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Bouncing universes in scalar-tensor gravity models admitting negative potentials

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Abstract

© 2015 IOP Publishing Ltd and Sissa Medialab srl . We consider the possibility to produce a bouncing universe in the framework of scalar-tensor gravity models in which the scalar field potential may be negative, and even unbounded from below. We find a set of viable solutions with nonzero measure in the space of initial conditions passing a bounce, even in the presence of a radiation component, and approaching a constant gravitational coupling afterwards. Hence we have a model with a minimal modification of gravity in order to produce a bounce in the early universe with gravity tending dynamically to general relativity (GR) after the bounce.

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Keywords

cosmic singularity, dark energy theory, modified gravity